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EXAMINER

HANEY, MATTHEW J

ART UNIT	PAPER NUMBER
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2613

DATE MAILED: 02/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/051,004

Applicant(s)

NGAI ET AL.

Examiner

Matthew Haney

Art Unit

2613

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-62 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-62 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-12, 15-32, 35-52, and 55-62 are rejected under 35 U.S.C. 102(e) as being anticipated by Keesman (US 5,805,220).

As for claims 1 and 42, Keesman teaches of employing multiple encode processes to encode multiple streams of video frames in parallel (Figure 1, Reference numbers 12 and 62); exchanging at least one input statistic or encode statistic (i.e. complexity which is the product of the number of bits and the average step size (i.e. quantization)) between the encode processes ; dynamically adapting encoding of at least one stream of video frames of the multiple streams of video frames based on relative complexity of the video frames comprising the multiple streams of video frames employing the at least one input statistic or encode statistic exchanged between the encode processes (Note: complexity modifies the target value, Column 3, Lines 23-37).

As for claim 2, Keesman teaches of providing an exchange interface between the multiple encode processes wherein said exchange interface facilitates said exchanging

of said at least one input statistic or encode statistic between the encode processing (Note: the exchange interface is the adjusting circuit 5, Column 3, Lines 23-37).

As for claims 3, 24, and 43, Keesman teaches of providing dedicated data and control buses between the multiple encoders for facilitating said exchanging of the at least one input statistic or encode statistic (Note: Figure 1 shows dedicated data lines between 14 and 51 and between 64 and 52 and dedicated control buses between 56 and 19 (T1) and between 57 and 24 (T2)).

As for claims 4 and 44, Keesman teaches of employing a joint rate control strategy distributed among said multiple encode processes (Column 3, Lines 23-26).

As for claims 5, 25, and 45, Keesman teaches of multiplexing resultant compressed video streams output by said multiple encode processes onto a constant bit rate channel (Figure 1 shows multiplexer 3 multiplexing the two outputs into a single bit-rate (T) channel).

As for claims 6, 26, and 46, Keesman teaches of partitioning of said constant bit rate channel capacity among said multiple encode processes (Column 3, Lines 18-21).

As for claims 7, 27, and 47, Keesman teaches of buffering output of each encode process of said multiple encode processes in a respective encode buffer prior to said multiplexing, and allowing expanded upper and lower bounds in at least one encode buffer when a new bit budget is allocated in its respective encode process, wherein an amount of data unloaded by each encode process from its respective encode buffer is a function of a total output of said multiple encode processes at any instance in time and said constant bit rate channel capacity (Column 4, Lines 5-20).

As for claims 8, 28, and 48, Keesman teaches of exchanging individual encoder statistics to allow determination of a total statistic corresponding to a sum of the at least one input statistics or encode statistics generated by said multiple encode processes (Column 3, Lines 46-47).

As for claims 9, 29, and 49, Keesman teaches of one encode processes uses both its own statistic and the total statistic to dynamically adapt the stream of video frames (Note: the dividers 54 and 55 compute a relative complexity for each encode processes, which is its one statistic divided by the total statistic, Column 3, Lines 46-54).

As for claims 10, 30, and 50, Keesman teaches of all encode processes uses both its own statistic and the total statistic to dynamically adapt the stream of video frames (Note: the dividers 54 and 55 compute a relative complexity for each encode processes, which is its one statistic divided by the total statistic, Column 3, Lines 46-54).

As for claims 11, 31, and 51, Keesman teaches of all encode processes uses both its own statistic and the total statistic to dynamically adapt the bit rate of the stream of video frames (Note: the bit rate (T_n) is adapted using the above described relative complexity, Column 3, Lines 55-67).

As for claims 12, 32, and 52, Keesman teaches of one encode processes uses its own statistic to dynamically adapt the bit rate of the stream of video frames (Note: the bit rate (T_n) is adapted using the above described relative complexity, Column 3, Lines 55-67).

As for claims 15, 35, and 55, Keesman teaches of said statistic being one of: frame activity, bit count, quantization, and inter-pixel difference (Note: aforementioned statistic is a combination of bit count and quantization, Column 3, Lines 23-37).

As for claims 16, 36, and 56, most of the limitations of the claim are contained in the above rejection of claim 1. Keesman also teaches of at least one characteristic thereof comprising at least one of an intra-frame characteristic or an inter-frame characteristic (Note: Keesman derives complexity which is higher for intra-frame and lower for inter-frame, Column 4, Lines 21-67).

As for claims 17 and 57, Keesman teaches of providing an exchange interface between the multiple encode processes wherein said exchange interface facilitates said exchanging of said at least one input statistic or encode statistic between the encode processing (Note: the exchange interface is the adjusting circuit 5, Column 3, Lines 23-37).

As for claims 18, 37, and 58, Keesman teaches of employing a joint rate control strategy distributed among said multiple encode processes (Column 3, Lines 23-26).

As for claims 19, 38, and 59, Keesman teaches of multiplexing resultant compressed video streams output by said multiple encode processes onto a constant bit rate channel (Figure 1 shows multiplexer 3 multiplexing the two outputs into a single bit-rate (T) channel); partitioning of said constant bit rate channel capacity among said multiple encode processes (Column 3, Lines 18-21).

As for claims 20, 39, and 60, Keesman teaches of process of said multiple encode processes ascertains said information derived on the at least one characteristic

of its respective stream of video frames, saves said information, and shares said information among said multiple encode processes during said exchanging to allow determination of a total statistic corresponding to a sum of the information derived on the at least one characteristic by each encode process of the multiple encode processes (Note: sum on the bottom of equation 6, Column 5, Lines 1-6).

As for claims 21, 40, and 61, Keesman teaches of sharing the total statistic among the multiple encode processes, wherein at least one encode process employs the total statistic and its own information during said dynamically adapting encoding to facilitate said dynamically encoding of the at least one stream of video frames of the multiple streams of video frames (Column 5, Lines 1-6).

As for claims 22, 41, and 62, Keesman teaches of controllable encode parameter comprises a bit rate employed by at least one encode process of said multiple encode processes (Note: equations in Column 6, Lines 1-13 show the bit-rate which is used).

As for claim 23, most of the limitations of the claim are contained in the above rejection of claim 1. Keesman teaches of a distributed joint rate controller (Column 3, Lines 23-26).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 13-14, 33-34, and 53-54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keesman (US 5,805,220) in view of Nam (US 5,617,150).

As for claims 13-14, 33-34, and 53-54, most of the limitations of the claims are contained in the above rejection of claim 12, 32, and 52. Keesman does not teach of said modifying done at a group of picture boundary or scene change in the stream of video frames being encoded by said at least one encode process, however, Nam does (Note: Nam teaches that when a scene change or end of subgop occurs the bit rate can effectively be changed, Column 5, Lines 49-61). It would have been obvious to one of ordinary skill in the art at the time of the invention to detect scene change or end of gops because in most cases the frame immediately following the aforementioned processes will result in a frame that requires a larger bit-rate (i.e. and I or P frame).

Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew Haney whose telephone number is 703-305-4915. The examiner can normally be reached on M-Th (5:30-3:00), Every Other Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chris Kelley can be reached on 703-305-4856. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Matthew Haney
Examiner
Art Unit 2613

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